



**TITLE:** Portable versus Fixed X-ray Equipment: A Review of the Clinical Effectiveness, Cost-effectiveness, and Guidelines

**DATE:** 22 February 2016

## **CONTEXT AND POLICY ISSUES**

Portable X-ray has been a useful tool for the diagnosis and monitoring of patients in the intensive care units,<sup>1,2</sup> in nursing homes,<sup>3</sup> in prisons, or in shelters for the homeless,<sup>4</sup> where transfer to the hospital radiology department may be an obstacle. The diagnostic efficacy of portable chest X-ray - or bedside chest X-ray - (defined as the number of chest X-rays showing new findings or changes to known findings divided by the total number of chest X-rays) for patients admitted to the intensive care unit has been reported to be 84.5%.<sup>5</sup> Mobile radiography services for radiological assessment of patients in nursing homes have shown to be technically feasible, with good image quality, and beneficial factors such as the security and comfort of patients, no need for transportation, and no need for staff to be absent from the nursing home to accompany the patients. One out of 123 patients (241 radiography examinations) had to have repeat radiography at the hospital because of underexposed images while image quality for the rest was adequate for diagnosis.<sup>3</sup> Mobile digital chest X-ray was found to be sensitive and specific in detecting pulmonary tuberculosis for homeless populations, drug users and prisoners.<sup>4</sup> Using culture-confirmed cases as comparator, mobile X-ray had a sensitivity of 81.8% (95% confidence interval [CI] 64.5 to 93.0) and a specificity of 99.2% (95% CI 99.1 to 99.3) for the detection of pulmonary tuberculosis.

Despite the advantages of portable X-ray, the image quality of bedside chest radiograph can be limited,<sup>6</sup> and the image interpretation and appropriate clinical action can be affected due to a decrease in communication between the attending physician and the radiologist.<sup>7</sup>

This Rapid Response report aims to review the clinical- and cost-effectiveness of portable X-ray compared to fixed X-ray. Guidelines associated with the use of portable X-ray will also be examined.

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**RESEARCH QUESTIONS**

1. What is the clinical effectiveness of portable x-ray imaging equipment versus fixed x-ray equipment?
2. What is the cost-effectiveness of portable x-ray imaging equipment versus fixed x-ray equipment?
3. What are the evidence-based guidelines for the use of portable x-ray equipment?

**KEY FINDINGS**

There was no evidence found from the literature search comparing the clinical or cost-effectiveness of portable X-ray to fixed X-ray. No guidelines on the use of portable X-ray were identified from the literature search.

**METHODS**

**Literature Search Strategy**

A limited literature search was conducted on key resources including Ovid Medline, PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2006 and January 22, 2016.

**Selection Criteria and Methods**

One reviewer screened the titles and abstracts of the retrieved publications and examined the full-text publications for the final article selection. Selection criteria are outlined in Table 1.

<b>Table 1: Selection Criteria</b>	
<b>Population</b>	Patients requiring x-ray imaging (chest or bone x-rays)
<b>Intervention</b>	Portable X-ray imaging
<b>Comparator</b>	Fixed X-ray imaging
<b>Outcomes</b>	Clinical effectiveness (e.g. image quality, time to result, diagnostic accuracy, changes in clinical outcomes) Cost-effectiveness Evidence-based guidelines
<b>Study Designs</b>	Health technology assessments (HTA), systematic reviews (SR), and meta-analyses (MA), randomized controlled trials (RCTs), non-RCTs, economic evaluations, and guidelines.

## **Exclusion Criteria**

Articles were excluded if they did not meet the selection criteria in Table 1, if they were published prior to January 2006 if they were duplicate publications of the same study, or if they were included in a selected systematic review.

## **SUMMARY OF EVIDENCE**

### **Quantity of Research Available**

The literature search yielded 809 citations. After screening of abstracts from the literature search and from other sources, six studies were retrieved for full-text review. Upon review of full-text articles, no study comparing the clinical and cost-effectiveness of portable X-ray to fixed X-ray was found. There were no guidelines on the use of portable X-ray identified in the literature search. The PRISMA flowchart in Appendix 1 details the process of the study selection.

### **Summary of Findings**

No relevant literature was identified pertaining to the comparative clinical or cost-effectiveness of portable X-ray versus fixed X-ray. Similarly, no evidence-based guidelines regarding the use of portable X-ray were identified.

## **CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING**

From the literature search from 2006 to 2016, the evidence on the clinical and cost-effectiveness of portable X-ray compared to fixed X-ray is lacking, and there were no evidence-based guidelines found for the use of portable X-ray equipment.

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Appendix 1: Selection of Included Studies

